United States Environmental Protection Agency
Office of Water 4606
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Unregulated Contaminant Monitoring Regulation Guidance for Operators of Public Water Systems Serving 10,000 or Fewer People

Foreword

This document provides guidance to owners and operators of small public water systems (that is, those serving 10,000 or fewer people) on the requirements of the revised UCMR Program. The data collected through this program will be used to support the development of the Contaminant Candidate List (CCL), to support the Administrator's determination of whether to regulate a contaminant, and to develop regulations. The revised monitoring program is one of the cornerstones of the sound science approach to future drinking water regulation that is an aim of the 1996 SDWA Amendments.

Under §1445(a)(2)(A) of the Safe Drinking Water Act (SDWA), as amended in 1996, the Environmental Protection Agency (EPA) is to promulgate regulations for an unregulated contaminant monitoring program by August 1999. The existing unregulated contaminant monitoring program has been performed according to the program described in CFR 141.40. The 1996 SDWA Amendments direct a substantially revised Unregulated Contaminant Monitoring Regulation (UCMR). The revised UCMR has a new list of contaminants and changes the number of public water systems (PWSs) that must conduct monitoring and the frequency and schedule for monitoring. Additional regulatory actions also include the cancellation of unregulated contaminant monitoring for small systems serving 10,000 or fewer people that is required under the existing UCMR Program.

Disclaimers

This is a draft for review purposes only and does not constitute U.S. Environmental Protection Agency policy. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

This guidance document is designed to implement national policy concerning this UCMR program. The document does not, however, substitute for the SDWA or EPA's regulations nor is this document itself a regulation. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA and State decisions makers retain the discretion to adopt approaches on a case-by-case basis that differs from this guidance where appropriate. EPA may change this guidance in the future.

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Section 1. Introduction

What is the Unregulated Contaminant Monitoring Regulation?

The Unregulated Contaminant Monitoring Regulation (UCMR) is required by the 1996 Amendments to the Safe Drinking Water Act (SDWA). The UCMR significantly revises the existing unregulated contaminant monitoring program that began in 1989. In addition, the 1996 Amendments to SDWA established the National Contaminant Occurrence Database (NCOD), which will be used to store and analyze data collected under the rule. For detailed UCMR Program information, the reader may refer to the UCMR Preamble and Rule (*CITE*).

What is the general goal of the revised UCMR Program?

As required by the 1996 SDWA Amendments, the revised UCMR requires monitoring of public water systems (PWSs) to determine, on a national basis, the location, concentration and related information regarding the occurrence of a list of unregulated contaminants in public drinking water. The results provided by the UCMR Program will be used by the Environmental Protection Agency (EPA) to determine which unregulated contaminants pose the greatest risks to human health and, if necessary, to set priorities for the regulation of those contaminants. Conversely, contaminants that are not detected at significant levels in drinking water supplies may be removed from consideration for regulation. The revised monitoring program is one of the cornerstones of the sound science approach to future drinking water regulation that is an aim of the 1996 SDWA Amendments.

How does this monitoring differ from the existing unregulated contaminant monitoring?

The existing unregulated contaminant monitoring program requires PWSs to monitor every five years for specified unregulated contaminants and to report the monitoring results to the States or EPA. The existing monitoring program contains 48 chemical contaminants and no microbiological contaminants. Systems with less than 150 service connections are waived from monitoring, provided they make their facilities available for the States to monitor. Repeat monitoring is required every five years.

For the revised UCMR Program, all PWSs serving greater than 10,000 people will be required to monitor, but only a nationally representative sample of systems serving 10,000 or fewer people will be required to monitor. Therefore, fewer systems will monitor under the revised UCMR Program than under the existing program. The quality of the monitoring data collected are very important for the success of the revised program; therefore, no system selected to participate in the national representative sample will be eligible for a waiver. EPA will place all data collected in the NCOD to enable more easy use, analysis, and public access of the monitoring data.

The revised UCMR Program also incorporates a new list of contaminants (shown in Table 1) and is comprised of three monitoring components: Assessment Monitoring (which will monitor for the List 1 contaminants), Screening Survey (which will monitor for the List 2 contaminants), and Pre-Screen Testing (which will monitor for the List 3 contaminants). Many of the these contaminants are new and emerging. Although there are 32 contaminants on these three lists, no more than 30 contaminants will be monitored at any one time.

Table 1. Contaminants in the UCMR (1999) Program

List	Contaminant Name
1	Chemical Contaminants : 2,4-dinitrotoluene (2,4-DNT), 2,6-dinitrotoluene (2,6-DNT), dimethyl tetrachloroterephthalate (DCPA) di-acid degradate, dimethyl tetrachloroterephthalate (DCPA) mono-acid degradate, dichloro chlorophenyl ethylene (DDE), s-ethyl-dipropylthio-carbamate (EPTC), Molinate, methyl-tert-butyl-ether (MTBE), Nitrobenzene, Terbacil Microbiological Contaminant : *Aeromonas hydrophila*
2	Chemical Contaminants : 1,2-diphenylhydrazine, 2-methyl-phenol, 2,4-dichlorophenol, 2,4-dinitrophenol, 2,4,6-trichlorophenol, Acetochlor, Alachlor ESA, Diazinon, Disulfoton, Diuron, Fonofos, Linuron, Prometon, Terbufos
3	Microbiological Contaminants : Adenoviruses, Cyanobacteria (fresh water algae & their toxins), Caliciviruses, Coxsackieviruses, Echoviruses, *Helicobacter pylori*, Microsporidia

Contaminants on List 1 (1999) will be monitored under the Assessment Monitoring component of the revised UCMR Program, contaminants on List 2 (1999) will be monitored under the Screening Survey component of the revised UCMR Program, and List 3 (1999) contaminants will be monitored under the Pre-Screen Testing component of the revised UCMR Program.

In a separate but related action, existing unregulated contaminant monitoring requirements have been canceled for systems serving 10,000 or fewer persons beginning in March 1999. EPA published a Direct Final Rule in the January 8, 1999 Federal Register (64 FR 1493), separate from the UCMR revisions, that cancels the third round of unregulated contaminant monitoring for small systems under the existing unregulated contaminant monitoring program. This third round of monitoring was canceled to save the cost of the final round of monitoring that would otherwise overlap with monitoring that is planned under the revised UCMR Program.

Section 2. Guidance and General Responsibilities for Public Water Systems Serving 10,000 or Fewer People

What is the purpose of this guidance?

This guidance identifies the sampling and reporting responsibilities of small PWSs (those serving 10,000 or fewer people) selected to participate in the Assessment Monitoring component of the revised UCMR Program. Only Assessment Monitoring is currently required under the revised UCMR Program. Table 2 shows the List 1 (1999) contaminants, along with their potential environmental sources, that are currently required for monitoring under the Assessment Monitoring component of the UCMR Program. The List 1 (1999) contaminants include ten chemical and one microbiological contaminants for which suitable analytical methods are currently available. The reader may refer to the UCMR Preamble and Rule (CITE) for more information.

Table 2. List 1 (1999) Contaminants of the UCMR Program

Chemical Contaminants	
Contaminant Name	**Environmental Source**
2,4-DNT	Used in the production of isocyanate, dyes, and explosives
2,6-DNT	Used as mixture with 2,4-DNT (similar uses)
DCPA di-acid degradate	Degradation product of DCPA; an herbicide used on grasses and weeds with fruit and vegetable crops
DCPA mono-acid degradate	Degradation product of DCPA; an herbicide used on grasses and weeds with fruit and vegetable crops
DDE	Degradation product of DDT; a general insecticide
EPTC	Herbicide used on grasses and weeds, with potatoes and corn
Molinate	Selective herbicide used with rice; controls watergrass
MTBE	Octane booster in unleaded gasoline
Nitrobenzene	Used in the production of aniline, which is used to make dyes, herbicides, and drugs
Terbacil	Herbicide used with sugarcane, alfalfa, fruit, etc.
Microbiological Contaminant	
Aeromonas hydrophila	Present in all freshwater and brackish water

Refer to Table 1 for definitions of chemical abbreviations.

Who needs to follow this guidance?

This guidance applies only to small PWSs that are selected as part of the national representative sample under the Assessment Monitoring component of the revised UCMR Program. Only selected community water systems and non-transient non-community water systems that are notified by their States and/or EPA will be included in this representative group and will be required to participate in this Assessment Monitoring sampling. Transient non-community water systems will not be included in this monitoring, unless required to do so by their States. Approximately 800 systems will be randomly selected out of the roughly 65,000 systems of this size.

What are the responsibilities of a system selected to participate in the national representative sample?

If your system is selected to participate in the national representative sample, you must collect samples at the times and locations specified by the revised UCMR. These sampling specifications are outlined in this guidance and in further documentation to be provided to you by the States and/or EPA at the time you are notified of your selection. You must send these samples to a laboratory designated by EPA to be analyzed for the contaminants of interest. You must also report the data collected to the State (or to EPA if the State does not have primacy) and include the data in your system's required public notification to its consumers, such as its annual Consumer Confidence Report.

When will sampling at the selected systems begin?

Systems selected for inclusion in the national representative sample will be notified by the State or EPA no later than October 2000. Sample collection will begin in 2001. Each system selected will monitor for one year during the three year Assessment Monitoring period which begins in 2001. The year in which you must monitor, if your system is selected, will be included in the notification from the State or EPA.

Who will pay for the monitoring?

EPA will pay for the costs associated with obtaining the necessary sampling bottles and containers, transporting the samples, and analyzing the samples at EPA-designated laboratories. EPA will not reimburse systems for labor hours used to collect these samples.

Which contaminants must I sample for if my system is selected to conduct the revised UCMR monitoring?

You must collect samples for the 11 List 1 (1999) contaminants that are listed in Table 2 under the Assessment Monitoring component of the revised UCMR Program. List 2 and List 3 contaminants (see Table 1) will be monitored under the Screening Survey and Pre-Screen Testing components of the revised UCMR program, respectively. However, monitoring is not, at this time, required for the List 2 and 3 contaminants since suitable analytical methods are not available for these compounds. Refer to the UCMR Preamble and Rule (CITE) for more information.

What laboratories can do the UCMR analyses?

For systems serving 10,000 or fewer people, only laboratories that are designated by EPA may analyze the UCMR samples.

Do I continue monitoring for the existing list of unregulated contaminants?

No. As of January 8, 1999, EPA has canceled monitoring for the existing list of 48 unregulated contaminants for PWSs serving 10,000 or fewer people.

What does it mean to be selected as an Index System?

An Index system is a small PWS (serving 10,000 or fewer people) that will monitor over an extended period of time to establish general information on small PWS operating conditions. This information, such as water source, pumping rates, and analytical results, will then be related to other systems of similar size and characteristics, and will enable EPA to develop standards more suitable for small systems. Monitoring data collected from Index systems will also provide insight into the temporal variability of contaminant occurrence. Approximately 20-30 small systems will be chosen as Index systems. EPA will pay for the full cost of sample collection and analysis for the chosen Index systems. Systems selected as Index systems will receive further guidance from EPA at the time of notification.

Sampling Instructions

How will I obtain the required sampling containers and equipment?

A laboratory hired by EPA to analyze UCMR samples will send a sample collection kit to each system selected to participate in the national representative sample. The laboratory will ship the sample collection kits to the system shortly before the specified sampling time. The sample collection kit will include:

1) an insulated sample shipping container or containers;
2) all required sampling bottles;
3) cold packs to cool samples in transit back to the laboratory;
4) a test kit to determine levels of residual chlorine;
5) a thermometer;
6) any chemicals needed to dechlorinate and/or preserve samples;
7) a pre-paid return shipping docket;
8) sample collection data forms; and
9) any additional instructions or materials from the laboratory that will be required for sample collection, dechlorination, and preservation.

The laboratory will provide a telephone number for you to call should any of the sample collection kit components arrive damaged or if any other problems or questions arise during sample collection. It is important to note that you will need to freeze the cold packs (that come in

the sampling kits) prior to sample collection. The cold packs must be frozen prior to placement in the shipping containers when returning the collected samples to the laboratories.

How do I conduct the sampling?

In general, the methods used for sample collection and preservation will be very similar to the methods used for compliance sampling. Although the laboratories will provide specific sample collection instructions, the general sample collection procedures for each group of contaminants are found in Section 3 of this document. The list of analytical methods and contaminants are briefly listed below:

1. **Sample Collection Procedures for EPA Method 524.2 or equivalent methods (SM6210D; D5790.95)**
   May be used for two volatile organic compounds (VOCs): MTBE and nitrobenzene.
   See Section 3.1.

2. **Sample Collection Procedures for EPA Method 525.2**
   May be used for six semi-volatile and other organic compounds: 4,4'-DDE, EPTC, Molinate, Terbacil, 2,4-dinitrotoluene, and 2,6-dinitrotoluene.
   See Section 3.2.

3. **Sample Collection Procedures for EPA Methods 508 and 508.1 or equivalent methods (D5812.96; 990.06)**
   May be used for one organic compound: 4,4'-DDE.
   See Section 3.3.

4. **Sample Collection Procedures for EPA Methods 507, 515.1, and 515.2 or equivalent methods (D5475-73; 991.07; and D5317.93; 992.32)**
   May be used for five compounds (primarily pesticides): EPTC, Molinate, Terbacil, DCPA mono-acid degradate, and DCPA di-acid degradate.
   See Section 3.4.

5. **Sample Collection Procedures for *Aeromonas hydrophila***
   May be used for *Aeromonas hydrophila*
   See Section 3.5

Where do I collect the required UCMR samples?

You must collect UCMR samples at the locations specified in this guidance. Sampling locations are contaminant specific, and the State or EPA will include detailed sample location instructions in their notification to the system. Laboratories will also include these sampling instructions in each sample collection kit sent to you. There are two general categories of sampling locations:

(1) At all entry points to the distribution system. These are points after treatment where the treated water enters the distribution system for delivery to consumers. These points are where the system must monitor for most chemicals. This sample location strategy follows the existing regulatory approach, so you will collect most UCMR monitoring samples at the entry points used for existing compliance sampling.

(2) At points/service connections within the distribution system. Sampling from within the distribution system is particularly important for microbiological contaminants. For *Aeromonas hydrophila* sampling, two sampling locations are specified: the portion of the distribution system with the longest residence time (where residual chlorine levels in treated systems are likely to be low) and a site representative of the distribution system, such as a site also used for sampling representative total coliforms or disinfection by-products. For small systems without disinfection, you should collect samples from service connections near the entry point and from the most distant connection.

What quality control requirements must I follow during sample collection?

There are two general types of quality control requirements that will apply to sample collection:

(1) Collect all samples using the sampling procedures presented in this guidance. For all contaminants, it is extremely important that you dechlorinate all samples at the time of collection. For detailed descriptions of these sampling procedures, please see Section 3 of this guidance.

(2) Conduct duplicate sampling at 10 percent of all participating systems. Duplicate sampling helps to ensure that data collected under this program are of sufficient quality. Because of this requirement, some systems will occasionally receive two sample collection kits for a single sampling period. If you receive two sample kits for a duplicate sample, you must collect the samples for each kit simultaneously, and you must return each kit to the analytical laboratory specified on the pre-paid return shipping docket contained in each kit.

What documentation is required by me at the time of sampling?

You must complete and then submit all sampling forms in the shipping container when you ship the container and samples back to the designated laboratory. For the first sampling kit you receive from the laboratory, you will be required to fill out nine "Data Elements" on the sampling form provided by the laboratory. These Data Elements are discussed in the **Specific Data Reporting Instructions** section of this guidance. For all sampling kits received from the laboratory thereafter, most of the Data Element information will be pre-printed by the laboratory on the sampling forms, but you must still check and confirm that all information on the sampling forms is correct. It is particularly important for you to check that all numbers on the sampling forms match the numbers on the sample bottles. You should also note any problems or unusual circumstances related to sampling in the area specified on the forms.

How do I send the samples and sampling forms to the analyzing laboratory?

You must send the UCMR samples, along with the sampling forms, to the laboratory for analysis immediately following collection and preservation. Place the collected samples (and completed sampling forms), along with the frozen cold packs, into the insulated shipping container that is included in the sample collection kit. The frozen cold packs will keep samples chilled at approximately 4° C during shipment. However, as with all samples, samples collected for *Aeromonas hydrophila* analysis must not be allowed to freeze during transport: use only the number of cold packs provided by the laboratory. Follow the specific sample packing instructions that will be provided by the laboratory in the sample collection kit.

After the samples are packed, immediately ship the samples and accompanying documentation to the designated laboratory via overnight delivery. Pre-paid shipping forms for the overnight delivery will be provided by the laboratory in the sample collection kits. You must schedule sample container pick-up or drop-off with the designated shipper to ensure that samples are shipped on the same day of collection. This is very important for ensuring the quality of the microbiological data, as the processing of the microbiological samples must begin within 30 hours of sample collection.

When would re-sampling be necessary?

Sample containers may occasionally break during shipment to the laboratory. If breakage occurs, it will be necessary to re-collect samples. You may also need to re-sample if, at the determination of the laboratory, samples previously collected and shipped to the laboratory were improperly collected. Re-sampling will also be necessary if you do not ship the *Aeromonas hydrophila* samples to the laboratory the same day they are collected; the laboratory must be given adequate time to prepare and analyze the *Aeromonas hydrophila* samples within 30 hours of collection. The laboratory will send to you additional sample collection kits and instructions for sample re-collection when necessary.

Timing Issues

How often will I need to collect samples?

Each system in the national representative sample will collect samples for one year during the three year Assessment Monitoring period. Systems using surface water, or ground water under the influence of surface water, must sample four times per year during their one year of Assessment Monitoring sampling. Ground water systems must sample two times per year during their one year of sampling. For all systems, one of the sampling times must fall between May 1 and July 31 (or an alternative period of greatest vulnerability specified by the State or EPA), and the other sampling time must be either six months before or after the May 1 - July 31 or other "vulnerable" sampling period. Approximately one-third of systems will monitor each year of the three year period.

How much flexibility do I have regarding the timing of sample collection?

The State or EPA will specify the time periods during which the participating systems must sample. When the sample collection kits arrive, additional instructions for the system will be included describing when the samples must be collected and returned.

How soon must I return the collected samples to the laboratories?

You must collect, pack, and ship samples in the same day since some of the samples must be processed at the laboratory within 30 hours of sample collection. Therefore, you must collect samples early enough in the day to ensure same-day shipment. Furthermore, you must collect and ship samples early enough in the week (i.e., not on Friday, Saturday, or Sunday) so that samples can be received and processed by the laboratory within 30 hours of sample collection. Within these limits, you may collect samples at any time that you deem appropriate. (If convenient, you may plan to collect standard compliance samples at the same time as samples for the UCMR program.)

Specific Data Reporting Instructions

What data do I need to report?

Although there are 20 Data Elements required for each sampling period, you are responsible for reporting nine of the Data Elements (while the laboratory will report the remaining 11 elements). The data are reported to the State and ultimately are transmitted to the EPA. Table 3 lists all the required Data Elements, and identifies and describes the nine Data Elements for which you are responsible for reporting. In addition, you must report the residual chlorine level you determined at the sampling site to allow for laboratory interpretation of microbiological data.

At the time you collect the first samples for the revised UCMR Program, you must fill out Data Elements 1 through 5 and 11 through 14. After this initial sample collection, Data Elements 1 through 4 and 11 through 14 will appear pre-printed on the sampling forms you receive from the laboratory for subsequent sampling. These Data Elements should be the same for all subsequent samples. You must fill out the sample collection date (Data Element 5) at the time of each sample collection. For each sample round, you are responsible for checking all Data Elements before the data is submitted to the State or EPA.

Table 3. Unregulated Contaminant Monitoring Regulation Reporting Requirements

Data Element Number	Data Element	Definition
1	Public Water System (PWS) Identification Number	The code used to identify each PWS. The code begins with the standard two-character postal State abbreviation; the remaining seven characters are unique to each PWS.
2	Sampling Station Type	The sampling station type from which the sample came. The valid choices are: (a) Finished water from treatment system (b) Finished/treated water from Entry Point to the distribution system after treatment (c) Finished/treated water from Within the Distribution System (d) Finished/treated water from End of the Distribution line with longest residence time (e) Finished/treated water from household/drinking water tap (f) Finished/treated water from unknown location (g) Other finished/treated water (h) Raw/untreated water
3	Water Source Type	The source type represented by the sample. The valid choices are: (a) Surface water from a stream or purchased surface water from a stream. (b) Surface water from a lake or reservoir, or purchased surface water from a lake or reservoir. (c) Ground water under the direct influence of surface water or purchased Ground water under the direct influence of surface water. (d) Ground water or purchased ground water.
4	Sample Identification Number	A unique identifier assigned by the PWS for each sample. *Note: The designated laboratory may specify these numbers in advance of sample collection.*
5	Sample Collection Date	The date the sample is collected.
6	Contaminant	LAB*
7	Analytical Results - Sign	LAB*
8	Analytical Result - Value	LAB*
9	Analytical Result - Unit of Measure	LAB*
10	Analytical Method Number	LAB*

Table 3. Unregulated Contaminant Monitoring Regulation Reporting Requirements		
11	Public Water System Facility Identification Number - Source Intake/Well, Treatment Plant and Sampling Station	An identification number established by the State, or, at the State's discretion, the PWS, and unique to the system for an intake for each source of water, a treatment plant and a sampling station. Within each PWS, each intake, treatment plant and sampling point must receive a unique identification number, including, for intake, surface water intake, ground water well or well field centroid, and including, for sampling station, entry points to the distribution system, wellhead, intake, or locations within the distribution system. The same identification number must be used consistently through the history of unregulated contaminant monitoring to represent the facility.
12	Public Water System Facility Type	The facility type represented by the water system facility identification number: (a) Intake (for surface water sources) (b) Well or well field (for ground water sources) (c) Treatment Plant (d) Sampling Station (e) Entry Point to Distribution System (f) Reservoir (g) Booster Station (h) Unknown
13	Latitude of the Public Water System Facility for Source Intake/Well and Treatment Plant	The east-west coordinate of each source intake, well or well field centroid, and treatment plant associated with a sample expressed as decimal degrees
14	Longitude of the Public Water System Facility for Source Intake/Well and Treatment Plant	The north-south coordinate of each source intake, well or well field centroid, and treatment plant associated with a sample expressed as decimal degrees
15	Sample Type	LAB*
16	Detection Level	LAB*
17	Detection Level Unit of Measure	LAB*
18	Analytical Precision	LAB*
19	Analytical Accuracy	LAB*
20	Presence/Absence	LAB*

* LAB indicates that this data element will be recorded by the designated laboratory.

What will happen after I send the samples to the laboratory?

The designated laboratory will process and analyze all samples submitted and will report the results to you. These results will include all of the Data Elements discussed above, and will be sent to you both electronically and in paper copy. Once you review and confirm the data, you will have ten days to forward the data to the State, which in turn will forward the data to EPA. The States will provide you with additional guidance as to how this data will be reported. If you prefer, the laboratories providing analyses for small systems can also provide electronic reporting directly to the State.

Will I need to notify the public of contaminant occurrence results?

Yes. All results on contaminant occurrence for a PWS under the revised UCMR Program must be included in the system's public notification, such as the annual Consumer Confidence Report required of the system for other monitoring results.

Who can I contact with further questions?

For questions pertaining to this guidance, please contact your drinking dater program contact as identified by the State or EPA Region.

EPA Headquarters:

Charles Job, Standards and Risk Management Division, Office of Ground Water and Drinking Water (MC-4607), U.S. Environmental Protection Agency, 401 M Street, SW, Washington D.C. 20460, (202) 260-7084.

Regional Contacts:

I. Anthony De Palma, JFK Federal Bldg., Room 2203, Boston MA 02203.
Phone: (617) 565-3610

II. Walter Andrews, 290 Broadway, Room 2432, New York, NY 10007-1866.
Phone: (212) 637-3880

III. Jeff Hass, 1650 Arch Street, Philadelphia PA 19103-2029.
Phone: (215) 814-5775

IV. Janine Morris, 345 Courtland Street, NE, Atlanta, GA 30365.
Phone: (404) 562-9480

V. Kim Harris, 77 West Jackson Blvd., Chicago, IL 60604-3507.
Phone: (312) 886-4239

VI. Larry Wright, 1445 Ross Avenue, Dallas, TX 75202.
Phone: (214) 665-7150

VII. Stan Calow, 726 Minnesota Ave., Kansas City, KS 66101.
Phone: (913) 551-7410

VIII. Rod Glebe, One Denver Place, 999 18th Street, Suite 500, Denver, CO 80202.
Phone: (303) 312-6627

IX. Bruce Macler, 75 Hawthorne Street, San Francisco, CA 94105.
Phone: (415) 744-1884

X. Larry Worley, 1200 Sixth Avenue, Seattle, WA 98101.
Phone: (206) 553-1893

General information may also be obtained from the EPA Safe Drinking Water Hotline. Callers within the United States may reach the Hotline at (800) 426-4791. The Hotline is open Monday through Friday, excluding federal holidays, from 9:00 a.m. to 5:30 p.m. Eastern Standard Time.

Section 3. Sampling Procedures

3.1 Sample Collection Procedures for Samples Analyzed with EPA Method 524.2 or equivalent methods (SM6210D; D5790.95)

Two volatile organic compounds (VOCs) monitored under the revised UCMR Program, methyl-tertiary-butyl-ether (MTBE) and nitrobenzene, may be analyzed with EPA Method 524.2. Samples for this method are collected in 40 milliliter to 120 milliliter screw cap bottles equipped with Teflon faced silicon septa. It is important to keep the sample bottles in an area known to be free of VOCs prior to sample collection. Use the following procedures for determining residual chlorine levels, collecting the samples, dechlorinating and preserving the samples, and finally preparing the samples for shipment:

Step 1. Test and record residual chlorine levels. If water to be sampled is known or suspected to contain residual chlorine, you must determine the level of residual chlorine. Use the chlorine test-kits and instructions supplied by the designated laboratory to test the water source from which the UCMR samples will be collected. Be sure to record the residual chlorine level on the sampling form after conducting the chlorine test.

Step 2. Collect the sample. Prior to filling the sample bottle, open the water tap and allow the system to flush until the water temperature has stabilized, usually about two minutes. Decrease the flow to a steady but small stream. Do not pre-rinse the sample bottle before sample collection. Do not use or sample from any hoses or tubing, or use other sampling equipment that contains rubber, gaskets, or other similar materials: these materials may contain chemicals that could leach back into the sample.

Fill the sample bottle from the small flowing stream directly from a metal tap or faucet. Fill the sample bottle until it almost overflows while ensuring that the dechlorination chemicals are not flushed out. The laboratory will provide sample bottles already containing dechlorination compounds (either ascorbic acid or sodium thiosulfate). The samples collected for UCMR analyses will therefore be dechlorinated simply by filling the sample bottles provided by the laboratory (since the bottles already contain the dechlorination compounds).

No air bubbles should pass through the sample while filling the bottle. No bubbles should be trapped in the sample when the bottle is sealed. After the sample bottle has been filled, close the bottle and invert three or four times, and then wait one minute before preserving the sample with acid.

Step 3. Preserve the sample with acid. The sample is next preserved with hydrochloric acid to reduce sample pH to retard microbiological degradation of the contaminants being analyzed. To preserve the sample, open the sample bottle (after waiting one minute after Step 2) and carefully add the contents of a pre-measured vial containing 1:1 hydrochloric

acid to the sample. The pre-measured vial is part of the sample collection kit supplied by the designated laboratory. A pH <2 is required for laboratory analysis.

Step 4. Seal the sample bottle and prepare it for shipping. Close the sample bottle, Teflon face down, and invert three or four times. Again, it is very important in VOC sampling that no air bubbles are trapped in the sample when the bottle is sealed. To cool the sample to 4°C, immediately place the sample bottle and the frozen cold packs into the provided insulated shipping container for return shipment to the designated laboratory. Store the samples and container away from light and excess heat, and record all relevant information on the sampling form provided.

3.2 Sample Collection Procedures for Samples Analyzed with EPA Method 525.2

Six organic compounds monitored under the revised UCMR program may be analyzed with EPA Method 525.2. These compounds included 4,4'-DDE, EPTC, Molinate, Terbacil, 2,4-dinitrotoluene and 2,6-dinitrotoluene. Samples for this method are collected in a 1 liter or 1 quart amber glass bottle fitted with a Teflon-lined screw cap. It is important to keep the sample bottle in an area known to be free of organic chemicals prior to sample collection. Use the following procedures for testing residual chlorine, collecting the samples, then dechlorinating and preserving the samples, and finally preparing the samples for shipment:

Step 1. Determine and record residual chlorine levels. If water to be sampled is known or suspected to contain residual chlorine, you must test for the level of residual chlorine. Use the chlorine test-kits and instructions supplied by the designated laboratory to test the water source from which the UCMR samples will be collected. Be sure to record the residual chlorine level on the sampling form after conducting the chlorine test.

Step 2. Collect the sample. Prior to filling the sample bottle, open the water tap and allow the system to flush until the water temperature has stabilized, usually about two minutes. Decrease the flow to a steady but small stream. Do not pre-rinse the sample bottle before sample collection. Do not use or sample from any hoses or tubing, or use other sampling equipment that contains rubber, gaskets, or other similar materials; these materials may contain chemicals that could leach back into the sample.

Fill the sample bottle from the small flowing stream directly from a metal tap or faucet. Fill the sample bottle until it almost overflows while ensuring that the dechlorination chemicals are not flushed out. The laboratory will provide sample bottles already containing dechlorination compounds (either ascorbic acid or sodium thiosulfate). The samples collected for UCMR analyses will therefore be dechlorinated simply by filling the sample bottles provided by the laboratory (since the bottles already contain the dechlorination compounds). After the sample bottle has been filled, close the bottle, invert three or four times and then wait one minute before preserving the sample with acid.

Step 3. Preserve the sample. The sample is next preserved with hydrochloric acid to reduce sample pH in order to retard microbiological degradation of the contaminants being analyzed. To preserve the sample, open the sample bottle (after waiting 1 minute after Step 2) and carefully add the contents of a pre-measured vial containing 1:1 hydrochloric acid to the sample. The pre-measured vial is part of the sample collection kit supplied by the designated laboratory. A pH <2 is required for laboratory analysis.

Step 4. Seal the sample bottle and prepare it for shipping. Close the sample bottle and invert three or four times. To cool the sample to 4°C, immediately place the sample and the frozen cold packs into the provided insulated shipping container for return shipment to the designated laboratory. Store samples and container away from light and excess heat, and record all relevant information on the sampling form provided.

3.3 Sample Collection Procedures for Samples Analyzed with EPA Method 508 or EPA Method 508.1 or equivalent methods (D5812.96; 990.06)

One compound monitored under the revised UCMR Program, 4,4'-DDE, may be analyzed using EPA Methods 508 or 508.1. Samples for these methods are collected in either a 1 liter special glass bottle fitted with a Teflon-lined screw cap or a one quart amber glass bottle fitted with a Teflon-lined screw cap. It is important to keep the sample bottle in an area known to be free of organic chemicals prior to sample collection. Use the following procedures for determining residual chlorine level, collecting the sample, dechlorinating and preserving the sample, and preparing the sample for shipment:

Step 1. Determine and record residual chlorine levels. If water to be sampled is known or suspected to contain residual chlorine levels, you must test for the level of residual chlorine. Use the chlorine test-kits and instructions supplied by the designated laboratory to test the water source from which the UCMR samples will be collected. Be sure to record the residual chlorine level on the sampling form after conducting the chlorine test.

Step 2. Collect the sample. Prior to filling the sample bottle, open the water tap and allow the system to flush until the water temperature has stabilized, usually about two minutes. Decrease the flow to a steady but small stream. Do not pre-rinse the sample bottle before sample collection. Do not use or sample from any hoses or tubing, or use other sampling equipment that contains rubber, gaskets, or other similar materials; these materials may contain chemicals that could leach back into the sample.

Fill the sample bottle from the small flowing stream directly from a metal tap or faucet. Fill the sample bottle until it almost overflows while ensuring that the dechlorination chemicals are not flushed out. The laboratory will provide sample bottles already containing dechlorination compounds (either ascorbic acid or sodium thiosulfate). The samples collected for UCMR analyses will therefore be dechlorinated simply by filling the sample bottles provided by the laboratory (since the bottles already contain the dechlorination

compounds). After the sample bottle has been filled, close the bottle, invert three or four times, and then wait one minute before preserving the sample with acid.

Step 3. Preserve the sample. Sample preservation with hydrochloric acid is only required for Method 508.1 to reduce sample pH to retard microbiological degradation of the contaminants being analyzed. To preserve the sample, open the sample bottle (after waiting one minute after Step 2) and carefully add the contents of a pre-measured vial containing 1:1 hydrochloric acid to the sample. The pre-measured vial is part of the sample collection kit supplied by the designated laboratory. A pH <2 is required for laboratory analysis.

Step 4. Seal the sample bottle and prepare it for shipping. Close the sample bottle and invert three or four times. To cool the sample to 4°C, immediately place the sample and the frozen cold packs into the provided insulated shipping container for return shipment to the designated laboratory. Store samples and container away from light and excess heat and record all relevant information on the sampling form provided.

3.4 Sample Collection Procedures for Samples Analyzed with EPA Method 507, EPA Method 515.1, EPA Method 515.2, or equivalent methods (D5475-73; 991.07; and D5317.93; 992.32)

Five contaminants monitored under the revised UCMR program may be analyzed with either EPA Method 507, EPA Method 515.1, or EPA Method 515.2. These contaminants include EPTC, Molinate, Terbacil, DCPA mono-acid degradate, and DCPA di-acid degradate. Samples for this method will be collected in a one liter or one quart special glass bottle fitted with a Teflon-lined screw cap. It is important to keep the sample bottle in an area known to be free of organic chemicals prior to sample collection. Use the following procedures for testing residual chlorine, collecting the sample, dechlorinating the sample, and preparing the sample for shipment:

Step 1. Determine and record residual chlorine levels. If water to be sampled is known or suspected to contain residual chlorine, you must test for the level of residual chlorine. Use the chlorine test-kits and instructions supplied by the designated laboratory to test the water source from which the UCMR samples will be collected. Be sure to record the residual chlorine level on the sampling form after conducting the chlorine test.

Step 2. Collect the sample. Prior to filling the sample bottle, open the water tap and allow the system to flush until the water temperature has stabilized, usually about two minutes. Decrease the flow to a steady but small stream. Do not pre-rinse the sample bottle before sample collection. Do not use or sample from any hoses or tubing, or use other sampling equipment that contains rubber, gaskets, or other similar materials; these materials may contain chemicals that could leach back into the sample.

Fill the sample bottle from the small flowing stream directly from a metal tap or faucet. Fill the sample bottle until it almost overflows while ensuring that the dechlorination chemicals

are not flushed out. The laboratory will provide sample bottles already containing dechlorination compounds (either ascorbic acid or sodium thiosulfate). The samples collected for UCMR analyses will therefore be dechlorinated simply by filling the sample bottles provided by the laboratory (since the bottles already contain the dechlorination compounds). After the sample bottle has been filled, close the bottle and invert three or four times.

Step 3. Seal the sample bottle and prepare it for shipping. Close the sample bottle and invert three or four times. To cool the sample to 4°C, immediately place the sample and the frozen cold packs into the provided insulated shipping container for return shipment to the designated laboratory. Store samples and container away from light and excess heat, and record all relevant information on the sampling form provided.

3.5 Sample Collection Procedures for Samples Analyzed for *Aeromonas hydrophila*

At the present time, *Aeromonas hydrophila* is the only microbiological contaminant that is monitored under the revised UCMR Program. Samples for measuring *Aeromonas hydrophila* are collected in a 120 milliliter sterile, non-toxic glass or plastic sample container with a leak-proof lid. Use the following procedures for testing residual chlorine, collecting and dechlorinating the sample, and finally preparing the sample for shipment:

Step 1. Determine and record residual chlorine levels. If water to be sampled is known or suspected to contain residual chlorine, you must test for the level of residual chlorine. Use the chlorine test-kits and instructions supplied by the designated laboratory to test the water source from which the UCMR samples will be collected. Be sure to record the residual chlorine level on the sampling form after conducting the chlorine test.

Step 2. Collect the sample. Prior to filling the sample bottle, open the water tap and allow the system to flush until the water temperature has stabilized, usually about two minutes. Decrease the flow to a steady but small stream. Do not pre-rinse the sample bottle before sample collection. Do not use or sample from any hoses or tubing, or use other sampling equipment that contains rubber, gaskets, or other similar materials; these materials may contain chemicals that could leach back into the sample.

Fill the sample bottle from the small flowing stream directly from a metal tap or faucet. Fill the sample bottle until almost full while ensuring that the dechlorination chemicals are not flushed out. The laboratory will provide sample bottles already containing dechlorination compounds (either ascorbic acid or sodium thiosulfate). The samples collected for UCMR analyses will therefore be dechlorinated simply by filling the sample bottles provided by the laboratory (since the bottles already contain the dechlorination compounds).

Containers must not be completely filled so there is sufficient space at the top of the sealed sample bottle to shake and mix the sample. However, a minimum sample volume of 100 milliliters is required for analysis.

Step 3. Seal the sample bottle and prepare it for shipping. Close the sample bottle and mix the sample by inverting the bottle three or four times. To cool the sample to 4°C, immediately place the sample and the frozen cold packs in the provided insulated shipping container for return shipment to the designated laboratory. Store samples and container away from light and excess heat, and record all relevant information, including the *time* of sampling, on the form provided.

Appendix A

Acronym List

2,4-DNT	- 2,4-dinitrotoluene
2,6-DNT	- 2,6-dinitrotoluene
4,4'-DDE	- 4,4'-dichloro dichlorophenyl ethylene, a degradation product of DDT
Alachlor ESA	- alachlor ethanesulfonic acid, a degradation product of alachlor
AOAC	- Association of Official Analytical Chemists
APHA	- American Public Health Association
ASDWA	- Association of State Drinking Water Administrators
ASTM	- American Society for Testing and Materials
BGM	- Buffalo Green Monkey cells, a specific cell line used to grow viruses
CAS	- Chemical Abstract Service
CASRN	- Chemical Abstract Service Registry Number
CCL	- Contaminant Candidate List
CCR	- Consumer Confidence Reports
CERCLA	- Comprehensive Environmental Response, Compensation and Liability Act
CFR	- Code of Federal Regulations
CFU	- colony forming unit
CFU/mL	- colony forming units per milliliter
CWS	- community water system
DCPA	-dimethyl tetrachloroterephthalate, chemical name of the herbicide dacthal
DCPA di- and mono-acid degradates	- degradation products of DCPA
DDE	- dichloro dichlorophenyl ethylene, a degradation product of DDT
DDT	- dichloro diphenyl trichloroethane, a general insecticide
EDL	- estimated detection limit
EPA	- Environmental Protection Agency
EPTC	- s-ethyl-dipropylthiocarbamate, an herbicide
EPTDS	- Entry Point to the Distribution System
ESA	- ethanesulfonic acid, a degradation product of alachlor
FACA	- Federal Advisory Committee Act
FTE	- full-time-equivalent

GC	- gas chromatography, a laboratory method
GLI method	- Great Lakes Instruments method
GW	- ground water
GWUISW	- ground water under the influence of surface water
HLPC	- high performance liquid chromatography, a laboratory method
ICR	- Information Collection Request / Rule
IRFA	- initial regulatory flexibility analysis
IMS	- immunomagnetic separation
IRIS	- Integrated Risk Information System
IS	- internal standard
LLE	- liquid/liquid extraction, a laboratory method
MAC	- mycobacterium avium complex
MCL	- maximum contaminant level
MDL	- method detection limit
MRL	- minimum reporting level
MS	- mass spectrometry, a laboratory method
MS	- sample matrix spike
MSD	- matrix spike duplicate
MTBE	- methyl-tert-butyl-ether, a gasoline additive
NAWQA	- National Water Quality Assessment Program
NCOD	- National Drinking Water Contaminant Occurrence Data Base
NDWAC	- National Drinking Water Advisory Council
NERL	- National Environmental Research Laboratory
NPS	- National Pesticide Survey
NTIS	- National Technical Information Service
NTNCWS	- non-transient non-community water system
NTTAA	- National Technology Transfer and Advancement Act
OGWDW	- Office of Ground Water and Drinking Water
OMB	- Office of Management and Budget
PAH	- Poly-aromatic hydrocarbon
PBMS	- Performance-Based Measurement System
pCi/L	- picocuries per liter
PCR	- polymerase chain reaction
Pb-210	- Lead-210, a naturally occurring, alpha-emitting radionuclide
Po-210	- Polonium-210, a naturally occurring, alpha-emitting radionuclide
PWS	- Public Water System

PWSF	- Public Water System Facility
QA	- quality assurance
QC	- quality control
RDX	- hexahydro-1,3,5-trinitro-1,3,5-triazine
RFA	- Regulatory Flexibility Act
RPD	- relative percent difference
RSD	- relative standard deviation
SBREFA	- Small Business Regulatory Enforcement Fairness Act
SD	- standard deviation
SDWA	- Safe Drinking Water Act
SDWIS	- Safe Drinking Water Information System
SDWIS FED	- the Federal Safe Drinking Water Information System
SM	- Standard Methods
SMF	- Standard Compliance Monitoring Framework
SOC	- synthetic organic compound
SPE	- solid phase extraction, a laboratory method
SRF	- State Revolving Fund
STORET	- Storage and Retrieval System
SW	- surface water
TBD	- to be determined
TNCWS	- transient non-community water system
UCMR	- Unregulated Contaminant Monitoring Regulations/Rule
μg/L	- micrograms per liter
UMRA	- Unfunded Mandates Reform Act of 1995
USEPA	- United States Environmental Protection Agency
UV	- ultraviolet
VOC	- volatile organic compound

Appendix B

Definitions

All monitored systems means the representative sample of community and non-transient non-community water systems serving 10,000 or fewer people that are selected to be part of a State Plan of such systems and community water systems serving more than 10,000 people.

Assessment Monitoring means sampling, testing, and reporting of listed contaminants that have available analytical methods and for which preliminary data indicate their possible occurrence in drinking water; all monitored systems must conduct assessment monitoring. Assessment Monitoring will be conducted for the List 1 (1999) Contaminants.

Index systems means a limited number of public water systems that are randomly selected from systems in State Plans, were selected through the process of operating a random number generator for public water system identification numbers, and must monitor and report quarterly over the five-year unregulated contaminant monitoring and listing cycle to establish conditions under which they operate that can be related to other systems of similar size and characteristics, such as water source, pumping rates and environmental setting.

Listed contaminant means a contaminant identified as an analyte in Table 1, 141.40(b)(5), the Unregulated Contaminant Monitoring Regulation. To distinguish the current (i.e., the 1999) UCMR listed contaminants from potential future UCMR listed contaminants, all references to UCMR contaminant lists will identify the appropriate year in parenthesis immediately following the referenced list. For example, the contaminants included in the UCMR (1999) List include the component lists identified as List 1 (1999), List 2 (1999) and List 3 (1999) contaminants.

Listing cycle means the five-year period for which each revised unregulated contaminant monitoring regulation list is effective and during which no more than 30 unregulated contaminants from the list may be required to be monitored. EPA is mandated to develop and promulgate a new UCMR List every five years.

Monitoring means, for the purposes of this section and distinct from Assessment Monitoring, all aspects of determining the quality of drinking water relative to the listed contaminants, including the sampling; testing; review and reporting of analytical results; and submission of the analytical results to the UCMR database.

*Most vulnerable systems (*or *Systems most vulnerable)* means a subset of 5 to not more than 25 systems of all monitored systems in a State that are determined by that State in consultation with the EPA Regional Office to be most likely to have the listed contaminants occur in their drinking waters, considering the characteristics of the listed contaminants, precipitation, system operation, and environmental conditions (soils, geology and land use).

Pre-Screen Testing means sampling, testing, and reporting of the listed contaminants that may have newly emerged as drinking water concerns and, in most cases, for which methods are in an early stage of development; Pre-Screen Testing on the listed contaminants after public notice and comment must be conducted by a limited number of systems (up to 200) through the use of a random generator selected from up to 25 most vulnerable systems. Pre-Screen Testing will be performed to determine whether a listed contaminant occurs in sufficient frequency in the most vulnerable systems or sampling locations to warrant its being included in future Assessment Monitoring or Screening Surveys. Pre-Screen Testing will be conducted for the List 3 (1999) Contaminants.

Representative Sample means a subset of community and non-transient non-community water systems serving 10,000 or fewer people which EPA selects using a random number generator to obtain public water system identification numbers to place them on the first representative sample list. The selection is weighted by population served within a State, water source and then by size categories of 10,000 to 3,301 people, 3,300 to 501 people, and 500 or fewer people; a State may substitute systems from a replacement list of such systems derived through the same method for systems in the first list because a system on the first list is closed, merged or purchases water from another system.

Sampling means the act of collecting water from the appropriate location in a public water system (from the applicable point from an intake or well to the end of a distribution line, or in some limited cases, a residential tap) following proper methods for the particular contaminant or group of contaminants.

Sampling Station(s) means a unique location(s) where UCMR samples are to be collected.

Screening Survey means sampling, testing, and reporting of the listed contaminants for which analytical methods are recently developed and have uncertain potential for occurrence in drinking water; a subset of approximately 300 systems from all monitored systems selected through use of a random number generator for public water system identification numbers. These systems must conduct the Screening Survey for the listed contaminants after public notice and comment to determine whether a listed contaminant occurs at a sufficient frequency and concentration (or density) to warrant being included in future Assessment Monitoring. Screening Surveys will be conducted for the List 2 (1999) Contaminants.

State means, for the purposes of this section, each of the fifty States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Northern Mariana Islands, the Virgin Islands, American Samoa, the Trust Territories of the Pacific Islands, and any Indian Tribe which has status as a State under Section 1451 of the Safe Drinking Water Act for this program.

*State Monitoring Plan (*or *State Plan)* means a State's portion of the national representative sample of community and non-tranisent non-community water systems serving 10,000 or fewer people and not purchasing their entire water supply from another public water system which must monitor for

unregulated contaminants. A State Plan may be developed by a State's acceptance of EPA's representative sample for that State, or by a State's selection of systems from a replacement list for systems specified in the first list that are closed, merged or purchase water from another system. A State Plan also includes a process by which the State will inform each public water system of its selection for the plan and of its responsibilities to monitor.

Testing means, for the purposes of this section and distinct from *Pre-Screen Testing*, the submission and/or shipment of samples following appropriate preservation practices to protect the integrity of the sample; the chemical, radiological, physical and/or microbiological analysis of samples; and the reporting of the sample's analytical results for evaluation. Testing is a subset of activities defined as *monitoring*.

Unregulated contaminants means chemical, microbiological, radiological and other substances that occur in drinking water or sources of drinking water that are not currently regulated under the federal drinking water program. The Environmental Protection Agency (EPA) has not issued standards for these substances in drinking water (i.e., maximum contaminant levels or treatment technology requirements). EPA is required by Congress to establish a program to monitor for selected unregulated contaminants in public water systems to determine whether they should be considered for future regulation to protect public health. The selected contaminants are listed in 141.40(b)(5), Table 1, the Unregulated Contaminant Monitoring Regulation List.

Vulnerable time means the quarter of the year that the primary enforcement authority (usually a State) determines a system, subset of systems, or all systems in a State, to be most likely to have the listed contaminants, as a group, in the highest concentrations or densities in its drinking water. This determination does not indicate that the listed contaminants will be in the drinking water with certainty, but only that, after considering the listed contaminants, precipitation, system operation and environmental conditions (soils, geology, land use), that the quarter has the best probability of capturing in time those contaminants in higher concentrations relative to other quarters of the year, if the contaminants were to occur.